

What is claimed is:

1 1. A test key for validating the doping concentration
2 of buried layers within a deep trench capacitor, which is
3 deposited in the scribe line region of a wafer, the test key
4 comprising:

5 a trench capacitor deposited in the scribe line region
6 with an electrode layer of a first doping
7 concentration, a first conducting layer of a
8 second doping concentration and a second
9 conducting layer of a third doping concentration;
10 an isolation region deposited in the trench capacitor,
11 penetrating the second conducting layer, and
12 extending into the first conducting layer so that
13 the second conducting layer is divided into a
14 first and second portion;
15 a first plug coupled to a first side of the first
16 portion of the second conducting layer;
17 a second plug coupled to a second side of the first
18 portion of the second conducting layer; and
19 a third plug coupled to the second portion of the
20 second conducting layer.

1 2. The test key as claimed in claim 1 further
2 comprising a first and second passing word line disposed
3 above the trench capacitor.

1 3. The test key as claimed in claim 1, wherein the
2 second doping concentration is determined as invalid if a

3 resistance between the first and second plug is measured as
4 lower than a predetermined value.

1 4. The test key as claimed in claim 1, wherein the
2 third doping concentration is determined as invalid if a
3 first resistance between the first and second plug is
4 measured as lower than a first predetermined value, and a
5 second resistance between the second and third plug is
6 measured as lower than a second predetermined value.

1 5. A method for validating the doping concentration
2 of buried layers within a deep trench capacitor, comprising
3 the steps of:

4 providing a wafer having at least one scribe line
5 region and a memory cell region;

6 forming a test key in the scribe line region and a
7 plurality of memory cells in the memory cell
8 region, wherein the test key comprises:

9 a trench capacitor deposited in the scribe line
10 region with an electrode layer of a first
11 doping concentration, a first conducting
12 layer of a second doping concentration and a
13 second conducting layer of a third doping
14 concentration;

15 an isolation region deposited in the trench
16 capacitor, penetrating the second conducting
17 layer, and extending into the first
18 conducting layer so that the second
19 conducting layer is divided into a first and
20 second portion;

21 a first plug coupled to a first side of the first
22 portion of the second conducting layer;
23 a second plug coupled to a second side of the
24 first portion of the second conducting
25 layer; and
26 a third plug coupled to the second portion of the
27 second conducting layer;
28 measuring a first resistance between the first and
29 second plug;
30 measuring a second resistance between the second and
31 third plug; and
32 validating the first, second and third doping
33 concentrations by the first and second
34 resistance.

1 6. The method as claimed in claim 5, wherein the test
2 key further comprises a first and second passing word line
3 disposed above the trench capacitor.

1 7. The method as claimed in claim 5, wherein the
2 second doping concentration is determined as invalid if a
3 resistance between the first and second plug is measured as
4 lower than a predetermined value.

1 8. The method as claimed in claim 5, wherein the
2 third doping concentration is determined as invalid if a
3 first resistance between the first and second plug is
4 measured as lower than a first predetermined value, and a
5 second resistance between the second and third plug is
6 measured as lower than a second predetermined value.